

Appl. No. 10/552,410
Amdt. dated July 31, 2007
Reply to Office Action of 05/01/2007
Attorney Docket No. 1217-052834

REMARKS

Claims 1-27 are pending in the application. Claims 1-7, 12, 14-21 and 27 are withdrawn from consideration pursuant to a previously imposed restriction requirement and subsequent election of claims 8-11, 13 and 22-26.

Claim 9 stands rejected under 35 U.S.C. §112, second paragraph, as being indefinite and, more particularly, the Examiner asserts that the limitation "the wind-up direction" lacks antecedent basis and it is unclear which direction is the wind-up direction. Applicant has amended claim 9 herein to address the Examiner's rejection. In this regard, the Examiner's attention is invited to page 22, line 7 bridging to page 23, line 24 of the specification and Figs. 7(a)-7(e) which describe the movement of the apparatus in detail.

Claims 8-10, 13 and 24-25 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,328,546 to Brady et al. in view of U.S. Patent No. 6,803,320 to Yamamoto and U.S. Patent No. 6,715,524 to Chen et al.

Claims 11, 22-23 and 26 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Brady in view of Yamamoto and Chen and further in view of U.S. Patent No. 6,080,263 to Saito et al.

Applicant respectfully requests reconsideration in light of the amendments made herein taken with the following remarks.

The present invention relates to a method and apparatus for sticking a tape to an adherend such as a semiconductor wafer. More particularly, the invention relates to a method and apparatus capable of preventing the warpage of an adherend, such as a thin semiconductor wafer, to which a protective tape has been stuck.

Specifically, pre-cut protective tapes 12 are attached to a long support film 10, and the support film 10 is attached to frame member 18 at positions where the pre-cut protective tape 12 to be stuck to an adherend (wafer) 14 is positioned within the frame member 18. The support film 10 is pressed to stick the pre-cut protective tape 12 to the adherend (wafer) 14, and the support film 10 is released from the tape 12. The long support film 10 is under tension, but this tension is decreased with respect to the pre-cut, spaced-apart protective tapes 12 when the support film 10 is attached to the frame member 18.

Accordingly, the pre-cut protective tape 12 stuck to the adherend has reduced residual stress, and the adherend such as a thin semiconductor wafer to which the tape 12 has been stuck is free from warpage which would otherwise be caused by a protective tape applied under tension.

Additionally, the protective tape 12 is pre-cut to approximately the shape of the adherend (wafer). Therefore, the pre-cutting prevents the cutter from damaging the outer peripheral edge of the wafer, which is a problem in the prior art. The claims have been amended to include these further limitations. The claims have also been amended to add additional structural limitations to address the Examiner's concern raised in paragraph 16 of the Office Action that certain of the claim phraseology may be taken as a method step. The features of the presently claimed apparatus as now amended contain structural limitations to distinguish over the prior art.

Yamamoto discloses a technique for applying multiple layers of protective tape to a wafer surface with a wiring pattern formed thereon and for separating the protective tape from the wafer surface. In Yamamoto's invention, as shown in Figs. 6-9, the invention uses a frame when separating the protective tape. This frame is used simply for supporting the wafer in order to handle the wafer more easily. On the other hand, the frame member 18 in the present invention is used to reduce residual stress on the protective tape. Therefore, the intended purpose of the frame in Yamamoto's invention and frame member 18 of the present invention is completely different. In fact, Yamamoto teaches that it is necessary to apply multiple layers of protective tape at a 90° orientation to one another in order to cancel out the residual stress and correct warp in the wafer (see col. 2, lines 42-51).

In Yamamoto's invention, after the protective tape T1 is stuck to the wafer W while under tension, it is cut to the shape of the wafer by a cutter unit 10. However, the cutter unit of Yamamoto may contact the outer peripheral edge of the wafer, thus damaging the wafer. The pre-cut protective tape 12 of the present invention eliminates this problem which is inherent in Yamamoto.

Yamamoto does, however, disclose that "the tape may be cut approximately to the shape of the wafer before application to the wafer", but there is no detailed description about how the protective tape is stuck on the wafer (see col. 7, lines 52-57). Although the tape is cut approximately to the shape of the wafer before application to the wafer, the invention of Yamamoto does not use a frame member to reduce residual stress on the protective tape. Yamamoto uses the frame F to merely hold an adhesive tape Tn adhered to the back surface of the wafer W (see Fig. 6, col. 6, lines 24-25) only during the removal of the previously applied protective tape T1 and T3. In all cases when the protective tapes T1 and T3 are applied to the wafer W, Yamamoto does not employ the frame F to relieve the tension thereto as in the present invention.

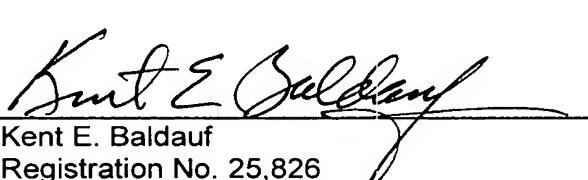
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The cited prior art references of Brady, Chen and Saito are superficially similar to the present invention. However, as discussed above, even if Yamamoto's invention is combined with Brady, Chen and Saito, it cannot reduce residual stress on the tape and cannot avoid warpage of the wafer as disclosed and claimed in the present application because the frame member of Yamamoto does not engage the support film (or the protective tape carried thereby) to relieve the tension in the protective tape when the protective tape is applied to the wafer.

The Examiner's reconsideration and favorable action regarding claims 8-11, 13 and 22-26 are respectfully requested.

Respectfully submitted,
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